*C*YBER*NET*ICS .

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Author: Frank Appiah is known as an Ashanti-Ghanaian pioneer in computer engineering, software engineering and computing.

Frank Appiah hold studentships at the Bsc. (Bachelor in computer engineering, *Kwame Nkrumah University*) student Level in 2009, Msc.(software engineering, *King's College London*) student Level in 2009/10 and PGStd (post-graduate student, *King's/IEEE*) mission level in 2010. Student Appiah created and developed a software platform called StreamEPS in the Java programming language. Appiah is a member of the National Academy of Engineering in 2010/2011 and holds the 'ING' title from Ghana Institute of (Software) Engineering.

Preface

This academic book is a study on cybernetic science, control, communication, advanced mathematics and dynamic modeling. This book is based on the research outputs of the author's studies at Kwame Nkrumah University of Science and Technology, College of Computer Engineering from 2013 to present. This book is a must read for all (post)graduate students, teachers, and more.

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Subject Classifications : Cybernetic Change : Advanced Mathematics and Electronics

2. A VALUE METHOD OF CHANGE IN TRANSITIVE MODELING OF A CAT SYSTEM.

Abstract: In this study, I look at the concept of change by transformation method offered by transform value or notation value and the representation of transformations. The value of each transform is assessed based on a transform and a notation.

Subject Classifications : Cybernetic Change: Advanced Mathematics and Electronics

3. A LOGICAL CONSTRUCTION OF CYBERNETIC VALUES BASED ON CAT SYSTEM.

Abstract: In this work, I study the determination of cybernetic values of a cat system based on logical construction approach. In each transformation, the cybernetic value of every transform is calculated along with their logical operations.

Subject Classifications : Cybernetic Change: Advanced Mathematics and Applied Logic.

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CHAPTER 1 :

A TRANSFORMATION METHOD OF CHANGE IN SIMULATION MODEL OF A CAT CAUSATIONS AND EFFECTIONS.

Frank Appiah

A TRANSFORMATION METHOD OF CHANGE IN SIMULATION MODEL OF A CAT CAUSATIONS AND EFFECTIONS.

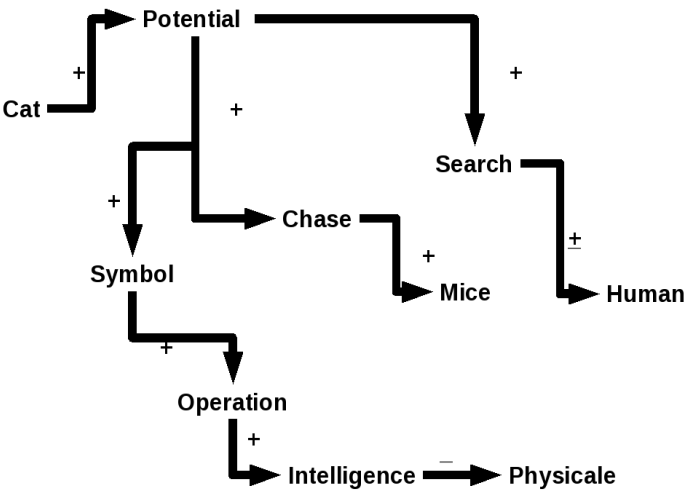
Abstract: In this study, I look at the concept of change by transformation method offered by cybernetics[2,3,5] and the representation of cat-mice-human causes and effects as a transition table. Here, transition table is similar to the case-to-case technique. Standard transition table is employed in the research.

Keywords: nature; operand; mutual; operator; cause-effect; interaction; transformation; change.

Subject classification codes:

1 INTRODUCTION

CAUSE-AND-EFFECT MODEL



Drawing 1: Cat Cause-Effect Model:

Cat Interaction [Author work of Art]

The CAUSE-EFFECT simulation[6] starts at the *cat[1]* case of point (positive, +). Then it effects a *potential* case which is

a positive point and from there the *potential* case becomes a cause case that effects a secondary effect called *symbol* (+ case of point). From the *symbol* case is a causal effect of *Operation* case of point which is positive. The *operation* case causes an *intelligence* effect, which is also positive in case. The case of positive *intelligence* causation is effected as *physicale* effect. The cat, potential, symbol, operation, intelligence and physicale causes-effects case of points are stopped at the physicale effect case of point. The case of point of a cause case towards an effect case for cat-to-physicale is represented as:

$$\boldsymbol{cat}+\rightarrow \boldsymbol{potential}+\rightarrow \boldsymbol{symbol}+\rightarrow \boldsymbol{operation}+\rightarrow \boldsymbol{intelligence}+\rightarrow \boldsymbol{physicale}-.$$

The next case of point is the branching of *potential* case from *cat* case of point. The *cat* case of point is positive towards the *potential* case of point. Then the *potential* cause case leads to-ward the *chase* effect which is a positive case of point. The *chase* cause case is also positive in effecting a positive *mice*(animal) case of point. The case of point of a *cause* case towards an effect case for cat-to-physicale is represented as:

$$cat+ \rightarrow potential+ \rightarrow chase+ \rightarrow mice+.$$

The next case of point is the branching of the *potential* case to the *search* case of point. The *cat* (case, +) cause case of point is towards the *potential* (case, +) effect case of point. Then from the *potential* cause of positive case point is pointed towards the *search* effect of either positive or negative case point. The *search* case of point is towards the *human* effect positive case. Then the cause-effect interaction stops. The case of point of a *cause* case towards an effect case for cat-to-human is represented as:

$$cat+ \rightarrow potential+ \rightarrow search\pm \rightarrow human+.$$

The discovery of cat cause-effect is major inclusion in technology in the areas of security intelligence, defense and security strategies and animal control and communication.

In section 2, the transformation method of change to the cat system is looked at. In section 3, a compact representation of

transforms of cat transitions are discussed along the condensation notation scheme. In section 4, a treatise on representation by matrix of transforms of cat transitions. In section 5, I will put forward the list of claims as /and the results of work. In section 6, I conclude on the transformation method as a means to change in a cat system.

Lets look at the transformation method of change.

2 TRANSFORMATION

A single transition[5] in a transform is given by an operand which is acted upon by an operator that change into a transform. A useful change is one that has more operands to be operated upon in a transition inducing characteristics transition for each. A transition is specified by two states and indication of a state changing to another state. Here, a cause state changes to an effect state in the transformation tables. A transformation is made up of a set of transitions, on a set of operands. There are three transformation to be discussed in

this section of study. The first is, “cat-to-physicale” operator. Thus, the “cat-to-physicale” operator will induce a number of transitions among which are:

$$\begin{aligned} cat+ &\rightarrow potential+ \\ potential+ &\rightarrow symbol+ \\ symbol+ &\rightarrow operation+ \\ operation+ &\rightarrow intelligence+ \\ intelligence+ &\rightarrow physicale- . \end{aligned}$$

The 5 set of transitions with 5 set of operands makes up a “*cat-to-physicale*” transformation.

The second transformation is the “*cat-to-mice*” operator and thus will induce 3 set of transitions among which are:

$$\begin{aligned} cat+ &\rightarrow potential+ \\ potential+ &\rightarrow chase+ \\ chase+ &\rightarrow mice+ . \end{aligned}$$

The 3 set of transitions with 3 set of operands makes up a “*cat-to-mice*” transformation. The final transformation is the “*cat-to-human*” operator. Thus will induce set of transitions among which are:

$$\begin{aligned} cat+ &\rightarrow potential+ \\ potential+ &\rightarrow search\pm \\ search\pm &\rightarrow human+ . \end{aligned}$$

The 3 set of transitions with 3 set of operands makes up a "*cat-to-human*" transformation.

A standard transformation of the three operators can be expressed as:

cat-to-physicale standard: $\downarrow \begin{matrix} c+ & p+ & s+ & o+ & i+ \\ p+ & s+ & o+ & i+ & y- \end{matrix}$ where cat+ is $c+$, potential+ is $p+$, symbol+ is $s+$, intelligence+ as $i+$, operation+ is $o+$ and physicale- is y-.

cat-to-mice standard: $\downarrow \begin{matrix} c+ & p+ & a+ \\ p+ & a+ & m+ \end{matrix}$ where cat+ is $c+$, potential+ is $p+$, chase+ is a+ and mice+ is $m+$.

cat-to-human standard: $\downarrow \begin{matrix} c+ & p+ & r\pm \\ p+ & r\pm & h+ \end{matrix}$ where cat+ is $c+$, potential+ is $p+$, search± is r± and human is $h+$.

The standard transformation is a closure because every element in the lower line appears in the upper line. The prop-

erty of closure is a relation between transformation and set of operands, if it is altered then closure is also altered.

3 NOTATION

It is sometimes needed to have a compact representation of operands of a transformation. Often the specification of transformation is made simple by simply relation that links all operands to their respective transforms. An operand can be represented:

$$Transform: \ \ Operand \rightarrow Operand + Number$$

The case of point of a cause case towards an effect case for cat-to-physicale is represented as:

$$\boldsymbol{cat} + \rightarrow \boldsymbol{potential} + \rightarrow \boldsymbol{symbol} + \rightarrow \boldsymbol{operation} + \rightarrow \boldsymbol{intelligence} + \rightarrow \boldsymbol{physicale} - .$$

The *cat* notation for cat-to-physicale transforms can be:

$$Transform\ 1: \ \ cat + \rightarrow cat^{+} + \ 0$$

$$Transform\ 2: \ \ potential + \rightarrow cat^{+} + \ 1$$

$$Transform\ 3: \ \ symbol + \ \rightarrow cat^{+} + \ 2$$

$$Transform\ 4: \ \ operation + \rightarrow cat^{+} + \ 3$$

$Transform\ 5:\ \ intelligence+ \rightarrow cat^{+} + \ 4$

$Transform\ 6:\ \ physicale- \rightarrow cat^{+} + \ 5$.

The *potential* notation for the cat-2-physicale transforms can be:

$Transform\ 7:\ \ cat+ \rightarrow potential^{+} + \ (-1)$

$Transform\ 8:\ \ potential+ \rightarrow potential^{+} + \ 0$

$Transform\ 9:\ \ symbol+ \ \rightarrow potential^{+} + \ 1$

$Transform\ 10:\ \ operation+ \rightarrow potential^{+} + \ 2$

$Transform\ 11:\ \ intelligence+ \rightarrow potential^{+} + \ 3$

$Transform\ 12:\ \ physicale- \rightarrow potential^{+} + \ 4$

The *symbol* notation of the cat-2-physicale transforms can be :

$Transform\ 13:\ \ cat+ \rightarrow symbol^{+} + \ (-2)$

$Transform\ 14:\ \ potential+ \rightarrow symbol^{+} + \ (-1)$

$Transform\ 15:\ \ symbol+ \ \rightarrow symbol^{+} + \ 0$

$Transform\ 16:\ \ operation+ \rightarrow symbol^{+} + \ 1$

$Transform\ 17:\ \ intelligence+ \rightarrow symbol^{+} + \ 2$

$Transform\ 18:\ \ physicale- \rightarrow symbol^{+} + \ 3$

The *operation* notation of the cat-2-physicale transforms can be:

$$Transform\ 19:\ cat+ \rightarrow operation^{+} + (-3)$$

$$Transform\ 20:\ potential+ \rightarrow operation^{+} + (-2)$$

$$Transform\ 21:\ symbol+ \rightarrow operation^{+} + (-1)$$

$$Transform\ 22:\ operation+ \rightarrow operation^{+} + 0$$

$$Transform\ 23:\ intelligence+ \rightarrow operation^{+} + 1$$

$$Transform\ 24:\ physicale- \rightarrow operation^{+} + 2$$

The *intelligence* notation of the cat-2-physicale transforms can be:

$$Transform\ 25:\ cat+ \rightarrow intelligence^{+} + (-4)$$

$$Transform\ 26:\ potential+ \rightarrow intelligence^{+} + (-3)$$

$$Transform\ 27:\ symbol+ \rightarrow intelligence^{+} + (-2)$$

$$Transform\ 28:\ operation+ \rightarrow intelligence^{+} + (-1)$$

$$Transform\ 29:\ intelligence+ \rightarrow intelligence^{+} + 0$$

$$Transform\ 30:\ physicale- \rightarrow intelligence^{+} + 1$$

The *physicale* notation of the cat-2-physicale transforms can be:

$Transform\ 31:\ \ cat+ \rightarrow physicale^{-}+\ (-5)$

$Transform\ 32:\ \ potential+ \rightarrow physicale^{-}+\ (-4)$

$Transform\ 33:\ \ symbol+\ \rightarrow physicale^{-}+\ (-3)$

$Transform\ 34:\ \ operation+ \rightarrow physicale^{-}+\ (-2)$

$Transform\ 35:\ \ intelligence+ \rightarrow physicale^{-}+\ (-1)$

$Transform\ 36:\ \ physicale- \rightarrow physicale^{-}+\ 0$

The case of point of a *cause* case towards an effect case for cat-to-mice is represented as:

$$\boldsymbol{cat}+\ \rightarrow \boldsymbol{potential}+\ \rightarrow \boldsymbol{chase}+\ \rightarrow \boldsymbol{mice}+.$$

The *cat* notation for cat-to-mice transforms can be :

$Transform\ 37:\ \ cat+ \rightarrow cat^{+}+\ 0$

$Transform\ 38:\ \ potential+ \rightarrow cat^{+}+\ 1$

$Transform\ 39:\ \ chase+\ \rightarrow cat^{+}+\ 2$

$Transform\ 40:\ \ mice+ \rightarrow cat^{+}+\ 3$

The *potential* notation for *cat-to-mice* transforms can be:

$Transform\ 41:\ \ cat+ \rightarrow potential^{+}+\ (-1)$

$Transform\ 42:\ \ potential+ \rightarrow potential^{+}+\ 0$

$$Transform\ 43:\ chase+\ \rightarrow potential^{+}+\ 1$$

$$Transform\ 44:\ mice+\rightarrow potential^{+}+\ 2$$

The *chase* notation for *cat-to-mice* transforms can be:

$$Transform\ 45:\ cat+\rightarrow chase^{+}+\ (-1)$$

$$Transform\ 46:\ \ potential+\rightarrow chase^{+}+\ 1$$

$$Transform\ 47:\ chase+\ \rightarrow chase^{+}+\ (0)$$

$$Transform\ 48:\ mice+\rightarrow chase^{+}+\ 1$$

The *mice* notation for *cat-to-mice* transforms can be:

$$Transform\ 49:\ cat+\rightarrow mice^{+}+\ (-3)$$

$$Transform\ 50:\ potential+\rightarrow mice^{+}+\ (-2)$$

$$Transform\ 51:\ chase+\ \rightarrow chase^{+}+\ (-1)$$

$$Transform\ 52:\ mice+\rightarrow mice^{+}+\ 0$$

The case of point of a *cause* case towards an effect case for cat-to-human is represented as:

$$\boldsymbol{cat}+\ \rightarrow \boldsymbol{potential}+\ \rightarrow \boldsymbol{search}\pm\ \rightarrow \boldsymbol{human}+.$$

The *cat* notation for cat-to-human transforms can be :

$Transform\ 53:\ \ cat+ \rightarrow cat^{+} + \ 0$

$Transform\ 54:\ \ potential+ \rightarrow cat^{+} + \ 1$

$Transform\ 55:\ \ search^{\pm} \rightarrow cat^{+} + \ 2$

$Transform\ 56:\ \ human+ \rightarrow cat^{+} + \ 3$

The *potential* notation for *cat-to-human* transforms can be:

$Transform\ 57:\ \ cat+ \rightarrow potential^{+} + \ (-1)$

$Transform\ 58:\ \ potential+ \rightarrow potential^{+} + \ 0$

$Transform\ 59:\ \ search^{\pm} \rightarrow potential^{+} + \ 1$

$Transform\ 60:\ \ human+ \rightarrow potential^{+} + \ 2$

The *search* notation for *cat-to-human* transforms can be:

$Transform\ 61:\ \ cat+ \rightarrow search^{\pm} + \ (-2)$

$Transform\ 62:\ \ potential+ \rightarrow search^{\pm} + \ (-1)$

$Transform\ 63:\ \ search\pm \ \rightarrow search^{\pm} + \ (0)$

$Transform\ 64:\ \ human+ \rightarrow search^{\pm} + \ 1$

The *human* notation for *cat-to-human* transforms can be:

$Transform\ 65:\ \ cat+ \rightarrow human^{+} + \ (-3)$

$Transform\ 66:\ \ potential+ \rightarrow human^{+} + \ (-2)$

$Transform\ 67: \ search\pm \ \rightarrow human^{+}+ \ (-1)$

$Transform\ 68: \ human+ \rightarrow human^{+}+ \ 0$

3.1 CONDENSATION NOTATION

The cat-2-physicale standard, cat-2-mice standard and cat-2-human standard transformations can be expressed in another context called condense notation. I will condense the cat-2-physicale standard transformation as:

$$\text{c2p: } \begin{cases} cat+ \rightarrow potential+ \\ potential+ \rightarrow symbol+ \\ symbol+ \rightarrow operation+ \\ operation+ \rightarrow intelligence+ \\ intelligence+ \rightarrow physicale- \end{cases} .$$

$$\text{C2m : } \begin{cases} cat+ \rightarrow potential+ \\ potential+ \rightarrow chase+ \\ chase+ \rightarrow mice+ \end{cases} .$$ The condensation of cat-2-mice standard transformation will be as labeled as c2m. The

cat-2-human standard transformation can be condensed as follows:

$$\text{C2h}: \begin{cases} cat+ \rightarrow potential+ \\ potential+ \rightarrow search\pm \\ search\pm \rightarrow human+ \end{cases}.$$

$$\text{cat2p}: \begin{cases} T1: cat+ \rightarrow cat^{+}+0 \\ T2: potential+ \rightarrow cat^{+}+1 \\ T3: symbol+ \rightarrow cat^{+}+2 \\ T4: operation+ \rightarrow cat^{+}+3 \\ T5: intelligence+ \rightarrow cat^{+}+4 \\ T6: physicale- \rightarrow cat^{+}+5. \end{cases}.$$

Finally, i will condense a cat notation for transforms 1- 6 as expressed as cat2p label. All the other transforms can be expressed in the condense notation.

4 REPRESENTATION BY MATRIX

All transformation expressed to this point can be represented in a single schema to show the mutual relation. This is done by writing the operands in horizontal rows and transforms in a column from left end and they form two sides of a triangle. + will be applied on the intersection of row and column if the head of column is transformed to an element in the left hand side other wise a zero (0) will be inserted.

Scheme: $= \{ \begin{matrix} + \text{ , } row \cap column \text{ } transforms \text{ } into \text{ } an \text{ } operand \\ 0 \text{ , } otherwise . \end{matrix}$

I will now represent the cat-2-physicale, cat-2-mice and cat-2-human matrices as :

Cat-2-Physicale						
↓	**C+**	**P+**	**S+**	**O+**	**I+**	**Y-**
C+	0	+	0	0	0	0
P+	0	0	+	0	0	0
S+	0	0	0	+	0	0

O+	**0**	**0**	**0**	**0**	**+**	**0**
I+	0	0	0	0	0	+
Y-	**0**	**0**	**0**	**0**	**0**	***0***

Cat-2-Mice				
↓	**C+**	**P+**	**A+**	**M+**
C+	0	+	0	0
P+	0	0	+	0
A+	0	0	0	+
M+	**0**	**0**	**0**	**0**

Cat-2-Human				
↓	**C+**	**P+**	**R±**	**H+**
C+	0	+	0	0
P+	0	0	+	0
R±	0	0	0	+

H+	**0**	**0**	**0**	**0**

Cat-2-physicale Mutual Relationship(MR):

MR-1: C+ ↓ C+ = 0; C+ ↓ P+= +; C+ ↓ S+= 0; C+ ↓ O+= 0; C+ ↓ I+= 0; C+ ↓ Y-= 0;

MR-2: P+ ↓ C+ = 0; P+ ↓ P+= 0; P+ ↓ S+= +; P+ ↓ O+= 0; P+ ↓ I+=0; P+ ↓ Y-= 0;

MR-3: S+ ↓ C+ = 0; S+ ↓ P+= 0; S+ ↓ S+= 0; S+ ↓ O+= +; S+ ↓ I+=0; S+ ↓ Y-= 0;

MR-4: O+ ↓ C+ = 0; O+ ↓ P+= 0; O+ ↓ S+= 0; O+ ↓ O+= 0; O+ ↓I+=+; O+ ↓ Y-= 0;

MR-5: Y- ↓ C+ = 0; Y- ↓ P+= 0; Y- ↓ S+= 0; Y- ↓ O+= 0; Y- ↓ I+=0; Y- ↓ Y-= 0;

Cat-2-Mice Mutual Relation:

MR-1: C+ ↓ C+ = 0; C+ ↓ P+= +; C+ ↓ A+= 0; C+ ↓ M+= 0;

MR-2: P+ ↓ C+ = 0; P+ ↓ P+= 0; P+ ↓ A+= +; P+ ↓ M+= 0;

MR-3: A+ ↓ C+ = 0; A+ ↓ P+= 0; A+ ↓ A+= 0; A+ ↓ M+= +;

MR-4: M+ ↓ C+ = 0; M+ ↓ P+= 0; M+ ↓ A+= 0; M+ ↓ M+= 0;

Cat-2-Human Mutual Relation:

MR-1: C+ ↓ C+ = 0; C+ ↓ P+= +; C+ ↓ R±= 0; C+ ↓ H+= 0;

MR-2: P+ ↓ C+ = 0; P+ ↓ P+= 0; P+ ↓ H+= +; P+ ↓ H+= 0;

MR-3: R± ↓ C+ = 0; R± ↓ P+= 0; R± ↓ H+= 0; R± ↓ H+= +;

MR-4: H+ ↓ C+ = 0; H+ ↓ P+= 0; H+ ↓ R±= 0; H+ ↓ H+= 0;

5 CLAIMS and RESULTS OF WORK:

1. There are three mutual relation(ship) of cat transformation.
2. There are four mutual relations in cat-2-human operator.
3. There are four mutual relations in cat-2-mice operator.
4. There are five mutual relations in cat-2-physicale operator.
5. There are about 36 entries on 6 x 6 cat-2-physicale representation by matrix transformation.
6. There are about 16 entries on 4 x 4 cat-2-mice representation by matrix transformation.
7. There are about 16 entries on 4 x 4 cat-2-human representation by matrix transformation.

8. There are about 36 mutual equations on 6 x 6 cat-2-physicale mutual relationship.
9. There are about 16 mutual equations on 4 x 4 cat-2-mice mutual relationship.
10. There are about 16 mutual equations on 4 x 4 cat-2-human mutual relationship.
11. There are 68 notation of transforms in a cat transformation.

6 CONCLUSION

This study-work started with an introduction to cat causation and effection states stimulated from [6]. Then a transformation of state transitions of the cat stimulated model are performed. A standard transformation of transitions of the stimulated states was performed. A notation approach to transform representation as compact is also achieved. A compact representation context of the transforms were achieved furthermore as condense notations. The fifth representation of transforms

of transition states was done by the representation by matrix scheme. The mutual relationships of the cat operator are expressed from the matrix scheme. Finally, the list of results of work is done in enumeration format.

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CHAPTER 2:

A VALUE METHOD OF CHANGE IN TRANSITIVE MODELING OF A CAT SYSTEM.

Frank Appiah

A VALUE METHOD OF CHANGE IN TRANSITIVE MODELING OF A CAT SYSTEM.

Abstract: In this study, I look at the concept of change by transformation method offered by transform value or notation value and the representation of transformations. The value of each transform is assessed based on a transform and a notation.

Keywords: nature; operand; operator; transform; model; cause-effect; notation; transformation; change; value; transition.

Subject classification codes:

1 INTRODUCTION

The CAUSE-EFFECT simulation[5] starts at the *cat* [1] case of point (positive, +). Then it effects a *potential* case which is a positive point and from there the *potential* case becomes a cause case that effects a secondary effect called *sym-*

bol (+ case of point). From the *symbol* case is a causal effect of *Operation* case of point which is positive. The *operation* case causes an *intelligence* effect, which is also positive in case. The case of positive *intelligence* causation is effected as *physicale* effect. The cat, potential, symbol, operation, intelligence and physicale causes-effects case of points are stopped at the physicale effect case of point. The case of point of a cause case towards an effect case for cat-to-physicale is represented as:

$$\boldsymbol{cat}+\rightarrow \boldsymbol{potential}+\rightarrow \boldsymbol{symbol}+\rightarrow \boldsymbol{operation}+\rightarrow \boldsymbol{intelligence}+\rightarrow \boldsymbol{physicale}-.$$

The next case of point is the branching of *potential* case from *cat* case of point. The *cat* case of point is positive towards the *potential* case of point. Then the *potential* cause case leads toward the *chase* effect which is a positive case of point. The *chase* cause case is also positive in effecting a positive *mice*(animal) case of point. The case of point of a *cause* case towards an effect case for cat-to-physicale is represented as:

$$\boldsymbol{cat}+\ \rightarrow \boldsymbol{potential}+\ \rightarrow \boldsymbol{chase}+\ \rightarrow \boldsymbol{mice}+.$$

The next case of point is the branching of the *potential* case to the *search* case of point. The *cat* (case, +) cause case of point is towards the *potential* (case, +) effect case of point. Then from the *potential* cause of positive case point is pointed towards the *search* effect of either positive or negative case point. The *search* case of point is towards the *human* effect positive case. Then the cause-effect interaction stops. The case of point of a *cause* case towards an effect case for cat-to-human is represented as:

$$\boldsymbol{cat}+ \rightarrow \boldsymbol{potential}+ \rightarrow \boldsymbol{search}\pm \rightarrow \boldsymbol{human}+.$$

A single transition[6] in a transform is given by an operand which is acted upon by an operator that change into a transform. A useful change is one that has more operands to be operated upon in a transition inducing characteristics transition for each. A transition is specified by two states and indication of a state changing to another state. Here, a cause state changes to an effect state in the transformation tables. A transformation is made up of a set of transitions, on a set of oper-

ands. There are three transformation to be discussed in this section of study. The first is, “cat-to-physicale” operator. Thus, the “cat-to-physicale” operator will induce a number of transitions among which are:

$$\begin{aligned} cat+ &\rightarrow potential+ \\ potential+ &\rightarrow symbol+ \\ symbol+ &\rightarrow operation+ \\ operation+ &\rightarrow intelligence+ \\ intelligence+ &\rightarrow physicale- . \end{aligned}$$

The 5 set of transitions with 5 set of operands makes up a “*cat-to-physicale*” transformation.

The second transformation is the “*cat-to-mice*” operator and thus will induce 3 set of transitions among which are:

$$\begin{aligned} cat+ &\rightarrow potential+ \\ potential+ &\rightarrow chase+ \\ chase+ &\rightarrow mice+ . \end{aligned}$$

The 3 set of transitions with 3 set of operands makes up a “*cat-to-mice*” transformation. The final transformation is the “*cat-to-human*” operator. Thus will induce set of transitions among which are:

$$cat+ \quad \rightarrow \quad potential+$$
$$potential+ \quad \rightarrow \quad search\pm$$
$$search\pm \quad \rightarrow \quad human+ .$$

The 3 set of transitions with 3 set of operands makes up a "*cat-to-human*" transformation.

A standard transformation of the three operators can be expressed as:

cat-to-physicale standard: $\downarrow \begin{matrix} c+ & p+ & s+ & o+ & i+ \\ p+ & s+ & o+ & i+ & y- \end{matrix}$ where cat+ is $c+$, potential+ is $p+$, symbol+ is $s+$, intelligence+ as $i+$, operation+ is $o+$ and physicale- is y-.

cat-to-mice standard: $\downarrow \begin{matrix} c+ & p+ & a+ \\ p+ & a+ & m+ \end{matrix}$ where cat+ is $c+$, potential+ is $p+$, chase+ is a+ and mice+ is $m+$.

cat-to-human standard: $\downarrow \begin{matrix} c+ & p+ & r\pm \\ p+ & r\pm & h+ \end{matrix}$ where cat+ is $c+$, potential+ is $p+$, search± is r± and human is $h+$.

The standard transformation[6] is a closure because every element in the lower line appears in the upper line. The property of closure is a relation between transformation and set of operands, if it is altered then closure is also altered.

The details of the next sections are as follows: In section 2, the transform value and notation value will look at in the transformation of state for a change in a dynamical system. In section 3, the claims or result of work will be enumerated and finally Section 4 concludes the study on the value method of change in dynamic modelling of a cat system.

2 TRANSFORM VALUE and NOTATION VALUE

It is sometimes needed to have a compact representation of operands of a transformation. Often the specification of transformation is made simple by simply relation that links all operands to their respective transforms. An operand can be represented:

$$Transform: \ Operand \rightarrow Operand + Number \ .$$

The transform value of an operand notation is the number in the transformation representation. It is expressed as:

$$Transform\ Value(TV) = Transform\ Number$$

The notation value is the total of each transform value in a transformation representation of a specific notation. It is expressed as :

$$Notation\ Value(NV) = \sum TV$$

The case of point of a cause case towards an effect case for cat-to-physicale is represented as:

$$\boldsymbol{cat}+\rightarrow \boldsymbol{potential}+\rightarrow \boldsymbol{symbol}+\rightarrow \boldsymbol{operation}+\rightarrow \boldsymbol{intelligence}+\rightarrow \boldsymbol{physicale}-.$$

The *cat* notation for cat-to-physicale transforms can be:

$$Transform\ 1:\ cat+\rightarrow cat^{+}+\ 0$$

$$Transform\ 2:\ potential+\rightarrow cat^{+}+\ 1$$

$$Transform\ 3:\ symbol+\ \rightarrow cat^{+}+\ 2$$

$$Transform\ 4:\ operation+\rightarrow cat^{+}+\ 3$$

$$Transform\ 5:\ intelligence+\rightarrow cat^{+}+\ 4$$

$$Transform\ 6:\ physicale-\rightarrow cat^{+}+\ 5\ .$$

In de terming the transform values of cat notation for cat-2physicale transformation, TVs are:

$TV_1=0$, $TV_2=1$, $TV_3=2$, $TV_4=3$, $TV_5=4$ and $TV_6=5$.

The notation value is sum of the six TVs and can be calculated as:

$$NV_1=\sum_{n=1}^{6} TV_n = TV_1+TV_2+TV_3+TV_4+TV_5+TV_6=$$

$$0+1+2+3+4+5= \underline{15.}$$

The double application can be abbreviated as $Transform: TV'=n+15$, where n is the operand to be transformed. The double application will be applied 14 times before the operand can be determined.

The *potential* notation for the cat-2-physicale transforms can be:

$Transform\ 7:\ \ cat+ \rightarrow potential^{+} + (-1)$

$Transform\ 8:\ \ potential+ \rightarrow potential^{+} + 0$

$$Transform\ 9:\ \ symbol+\ \rightarrow potential^{+}+\ 1$$

$$Transform\ 10:\ \ operation+\rightarrow potential^{+}+\ 2$$

$$Transform\ 11:\ \ intelligence+\rightarrow potential^{+}+\ 3$$

$$Transform\ 12:\ \ physicale-\rightarrow potential^{+}+\ 4$$

In de terming the transform values of potential notation for cat-2physicale transformation, TVs are:

TV_7=-1, TV_8=0, TV_9=1, TV_{10}=2, TV_{11}=3 and TV_{12}=4.

The notation value is sum of the six TVs from transforms 7 to 12 and can be calculated as:

$$NV_2=\sum_{n=7}^{12} TV_n = TV_7+TV_8+TV_9+TV_{10}+TV_{11}+TV_{12}= -1$$

$$+0+1+2+3+4= \underline{9.}$$

Transform 7 with operands (cat+, potential+) and Transform 9 with operands (symbol+, potential+) do cancel each other because of their -1 and 1 values. Transform 8 with operand potential does not change into any new operand except itself. The notation value is 9 and it is does not correspond to any TV

unless double application is done. The double application can be abbreviated as $Transform: TV' = n + 9$, where n is the operand to be transformed. The double application will be applied 8 times before the operand can be determined. It will be explored in the next study work.

The *symbol* notation of the cat-2-physicale transforms can be :

$Transform\ 13: \ cat+ \rightarrow symbol^{+} + (-2)$

$Transform\ 14: \ potential+ \rightarrow symbol^{+} + (-1)$

$Transform\ 15: \ symbol+ \rightarrow symbol^{+} + 0$

$Transform\ 16: \ operation+ \rightarrow symbol^{+} + 1$

$Transform\ 17: \ intelligence+ \rightarrow symbol^{+} + 2$

$Transform\ 18: \ physicale- \rightarrow symbol^{+} + 3$

In de terming the transform values of symbol notation for cat-2physicale transformation, TVs are:

TV_{13}=-2, TV_{14}=-1, TV_{15}=0, TV_{16}=1, TV_{17}=2 and TV_{18}=3.

The notation value is sum of the six TVs from transforms 13 to 18 and can be calculated as:

$$NV_3 = \sum_{n=13}^{18} TV_n = TV_{13}+TV_{14}+TV_{15}+TV_{16}+TV_{17}+TV_{18}=$$

$$-2-1+0+1+2+3= \underline{3.}$$

Transform 13 with operands (cat+, symbol+) and Transform 17 with operands (symbol+, potential+) do cancel each other because of their -2 and 2 values. Transform 14 with operands (potential+, symbol+) and Transform 16 with operands (symbol+, operation+) do cancel each other because of their -1 and 1 values. There is a double cancellation in the symbol notation. Transform 15 with operand symbol+ does not change into any new operand except itself. The notation value is 3 and it's double application can be abbreviated as $Tv' = n + 3$ where n is operand to be applied. Here, NV corresponds TV_{18} because its value already exist in the transform 18. NV transform can cause a change from *physicale-* to *symbol+*.

The *operation* notation of the cat-2-physicale transforms can be:

$$Transform\ 19:\ \ cat+ \rightarrow operation^{+} + (-3)$$

$$Transform\ 20:\ \ potential+ \rightarrow operation^{+} + (-2)$$

$$Transform\ 21:\ symbol+\ \rightarrow operation^{+}+\ (-1)$$

$$Transform\ 22:\ operation+\rightarrow operation^{+}+\ 0$$

$$Transform\ 23:\ intelligence+\rightarrow operation^{+}+\ 1$$

$$Transform\ 24:\ physicale-\rightarrow operation^{+}+\ 2$$

In de terming the transform values of operation notation for cat-2physicale transformation, TVs are:

TV_{19}=-3, TV_{20}=-2, TV_{21}=-1, TV_{22}=0, TV_{23}=1 and TV_{24}=2.

The notation value is sum of the six TVs and can be calculated as:

$$NV_4=\sum_{n=19}^{24} TV_n = TV_{19}+TV_{20}+TV_{21}+TV_{22}+TV_{23}+TV_{24}=$$

$$-3-2-1+0+1+2=\ -\underline{3.}$$

NV is a negative 3 value and the double application abbreviated as $TV'=n-3$ will be applied from a right-end instead of the left-end for positive values. Transforms 20 and 24 do cancel each other because of their -2 and 2 values respectively. Again, transforms 21 and 23 also cancels because of their of

-1 and 1 values respectively. NV transform can cause a change from *cat*+ to *operation*+ because its values is equal to transform 19. Transform 21 does not cause a change in cat-physicale operation. $NV_4 = -NV_3$ Can be deduced from the transforms.

The *intelligence* notation of the cat-2-physicale transforms can be:

$$Transform\ 25:\ cat+ \rightarrow intelligence^{+} + (-4)$$

$$Transform\ 26:\ potential+ \rightarrow intelligence^{+} + (-3)$$

$$Transform\ 27:\ symbol+ \rightarrow intelligence^{+} + (-2)$$

$$Transform\ 28:\ operation+ \rightarrow intelligence^{+} + (-1)$$

$$Transform\ 29:\ intelligence+ \rightarrow intelligence^{+} + 0$$

$$Transform\ 30:\ physicale- \rightarrow intelligence^{+} + 1$$

In de terming the transform values of intelligence notation for cat-2physicale transformation, TVs are:

TV_{25}=-4, TV_{26}=-3, TV_{27}=-2, TV_{28}=-1, TV_{29}=0 and TV_{30}=1.

The notation value is sum of the six TVs and can be calculated as:

$$NV_5 = \sum_{n=25}^{30} TV_n = TV_{25}+TV_{26}+TV_{27}+TV_{28}+TV_{29}+TV_{30}=$$

$$-4-3-2-1+0+1= -9.$$

NV is a negative 9 value and the double application abbreviated as $TV' = n - 9$ will be applied from a right-end instead of the left-end for positive values. Transforms 28 and 30 do cancel each other because of their -1 and 1 values respectively. Transform 29 does not cause a change in cat-physicale operation. $NV_5 = -NV_2$ Can be deduced by inspection.

The *physicale* notation of the cat-2-physicale transforms can be:

$Transform\ 31:\ \ cat+ \rightarrow physicale^{-}+\ (-5)$

$Transform\ 32:\ \ potential+ \rightarrow physicale^{-}+\ (-4)$

$Transform\ 33:\ \ symbol+\ \rightarrow physicale^{-}+\ (-3)$

$Transform\ 34:\ \ operation+ \rightarrow physicale^{-}+\ (-2)$

$Transform\ 35:\ \ intelligence+ \rightarrow physicale^{-}+\ (-1)$

$Transform\ 36:\ \ physicale- \rightarrow physicale^{-}+\ 0$

In de terming the transform values of physicale notation for cat-2-physicale transformation, TVs are:

TV_{31}=-5, TV_{32}=-4, TV_{33}=-3, TV_{34}=-2, TV_{35}=-1 and TV_{30}=0.

The notation value is sum of the six TVs and can be calculated as:

$$NV_6 = \sum_{n=31}^{36} TV_n = TV_{31}+TV_{36}+TV_{37}+TV_{38}+TV_{39}+TV_{40}=$$

$$-5-4-3-2-1+0= -\underline{15.}$$

$NV_6 = -NV_5$ is a relationship between the notation transforms 5 and 6. NV is a negative 15 value and the double application abbreviated as $TV' = n - 15$.

The case of point of a *cause* case towards an effect case for cat-to-mice is represented as:

$$\boldsymbol{cat}+ \rightarrow \boldsymbol{potential}+ \rightarrow \boldsymbol{chase}+ \rightarrow \boldsymbol{mice}+.$$

The *cat* notation for cat-to-mice transforms can be :

$$Transform\ 37:\ cat+ \rightarrow cat^{+}+\ 0$$

$$Transform\ 38:\ potential+ \rightarrow cat^{+}+\ 1$$

$$Transform\ 39:\ chase+\ \rightarrow cat^{+}+\ 2$$

$$Transform\ 40:\ mice+ \rightarrow cat^{+}+\ 3$$

In de terming the transform values of cat notation for cat-2-mice transformation, TVs are:

$TV_{37}=0,\ TV_{38}=1, TV_{39}=2$ and $TV_{40}=3.$

The notation value is sum of the four TVs and can be calculated as:

$$NV_7=\sum_{n=37}^{40} TV_n = TV_{37}+TV_{38}+TV_{39}+TV_{40}= 0+ 1+ 2 + 3= \underline{6.}$$

NV is a 6 value and the double application abbreviated as $TV' = n + 6$. The double application will be applied 5 times before the operand can be determined.

The *potential* notation for *cat-to-mice* transforms can be:

$$Transform\ \ 41:\ \ cat+ \rightarrow potential^{+} + \ (-1)$$

$$Transform\ \ 42:\ \ potential+ \rightarrow potential^{+} + \ 0$$

$$Transform\ \ 43:\ chase+ \ \rightarrow potential^{+} + \ 1$$

$$Transform\ \ 44:\ \ mice+ \rightarrow potential^{+} + \ 2$$

In de terming the transform values of potential notation for cat-2-mice transformation, TVs are:

TV_{41}=-1, TV_{42}=0, TV_{43}=1 and TV_{44}=2.

The notation value is sum of the four TVs and can be calculated as:

$$NV_8 = \sum_{n=41}^{44} TV_n = TV_{41}+TV_{42}+TV_{43}+TV_{44} = -1 + 0 + 1 + 2 = \underline{2.}$$

NV is a 2 value and the double application abbreviated as $TV' = n + 2$. The double application will be applied one time before the operand can be determined. Transforms 41 and

43 do cancel because of their -1 and 1 values. Transform 42 changes to nothing.

The *chase* notation for *cat-to-mice* transforms can be:

$$Transform\ 45:\ cat+ \rightarrow chase^{+}+\ (-2)$$

$$Transform\ 46:\ potential+ \rightarrow chase^{+}+\ (-1)$$

$$Transform\ 47:\ chase+\ \rightarrow chase^{+}+\ (0)$$

$$Transform\ 48:\ mice+ \rightarrow chase^{+}+\ 1$$

In de terming the transform values of chase notation for cat-2-mice transformation, TVs are:

TV_{45}=-2, TV_{46}=-1, TV_{47}=0 and TV_{48}=1.

The notation value is sum of the four TVs and can be calculated as:

$$NV_9=\sum_{n=45}^{48} TV_n = TV_{45}+TV_{46}+TV_{47}+TV_{48}= -2 - 1 + 0 + 1 = -2.$$

NV is a -2 value and the double application abbreviated as $TV' = n - 2$. The double application will be applied one time from right-end before the operand can be determined. Transforms 46 and 48 do cancel because of their -1 and 1 values. Transform 47 changes to nothing.

The *mice* notation for *cat-to-mice* transforms can be:

$$Transform\ 49:\ cat+ \rightarrow mice^{+}+\ (-3)$$

$$Transform\ 50:\ potential+ \rightarrow mice^{+}+\ (-2)$$

$$Transform\ 51:\ chase+ \rightarrow chase^{+}+\ (-1)$$

$$Transform\ 52:\ mice+ \rightarrow mice^{+}+\ 0$$

In de terming the transform values of chase notation for cat-2-mice transformation, TVs are:

TV_{49}=-3, TV_{50}=-2, TV_{51}=-1 and TV_{52}=0.

The notation value is sum of the four TVs and can be calculated as:

$$NV_{10} = \sum_{n=49}^{52} TV_n = TV_{49} + TV_{50} + TV_{51} + TV_{52} = -3 + -2 - 1 + 0 = -6.$$

NV is a -6 value and the double application abbreviated as $TV' = n - 6$. The double application will be applied 5 times from right-end before the operand can be determined. Transforms 46 and 48 do cancel because of their -1 and 1 values. Transform 47 changes to nothing.

The case of point of a *cause* case towards an effect case for cat-to-human is represented as:

$$\boldsymbol{cat}+ \rightarrow \boldsymbol{potential}+ \rightarrow \boldsymbol{search}\pm \rightarrow \boldsymbol{human}+.$$

The *cat* notation for cat-to-human transforms can be :

$$Transform\ 53:\ cat+ \rightarrow cat^{+} + 0$$

$$Transform\ 54:\ potential+ \rightarrow cat^{+} + 1$$

$$Transform\ 55:\ search^{\pm} \rightarrow cat^{+} + 2$$

$$Transform\ 56:\ human+ \rightarrow cat^{+} + 3$$

In de terming the transform values of cat notation for cat-2-human transformation, TVs are:

$TV_{53}=0,\ TV_{54}=1, TV_{55}=2$ and $TV_{56}=3.$

The notation value is sum of the four TVs and can be calculated as:

$$NV_{11}=\sum_{n=53}^{56} TV_n = TV_{53}+TV_{54}+TV_{55}+TV_{56}= 0 + 1 + 2 + 3 = \underline{6.}$$

It can be deduced that $NV_{11} = -NV_{10}$ from a value inspection. NV has a 6 value and the double application abbreviated as $TV' = n + 6$. Transform 53 changes into nothing.

The *potential* notation for *cat-to-human* transforms can be:

$Transform\ 57:\ cat+ \rightarrow potential^{+} + (-1)$

$Transform\ 58:\ potential+ \rightarrow potential^{+} + 0$

$Transform\ 59:\ search^{\pm} \rightarrow potential^{+} + 1$

$Transform\ 60:\ human+ \rightarrow potential^{+} + 2$

In de terming the transform values of potential notation for cat-2-human transformation, TVs are:

TV_{57}=-1, TV_{58}=0, TV_{59}=1 and TV_{60}=2.

The notation value is sum of the four TVs and can be calculated as:

$$NV_{12}=\sum_{n=57}^{60} TV_n = TV_{57}+TV_{58}+TV_{59}+TV_{60}= -1 + 0 + 1 + 2 = \underline{2.}$$

NV is a 2 value and the double application abbreviated as $TV' = n + 2$. The double application will be applied once from right-end before the operand can be determined. Transforms 57 and 59 do cancel because of their -1 and 1 values. Transform 58 changes to nothing.

The *search* notation for *cat-to-human* transforms can be:

$$Transform\ 61:\ cat+ \rightarrow search^{\pm}+ (-2)$$

$$Transform\ 62:\ potential+ \rightarrow search^{\pm}+ (-1)$$

$Transform\ 63:\ search\pm \rightarrow search^{\pm} + (1)$

$Transform\ 64:\ human+ \rightarrow search^{\pm} + 0$

In de terming the transform values of search notation for cat-2-human transformation, TVs are:

TV_{61}=-2, TV_{62}=-1, TV_{63}=1 and TV_{64}=0.

The notation value is sum of the four TVs and can be calculated as:

$$NV_{13} = \sum_{n=61}^{64} TV_n = TV_{61} + TV_{62} + TV_{63} + TV_{64} = -2 - 1 + 1 + 0 = \underline{-2.}$$

NV has a -2 value and the double application abbreviated as $TV' = n - 2$. The double application will be applied once from right-end before the operand can be determined. Transforms 63 and 64 do cancel because of their -1 and 1 values. Transform 47 changes to nothing. It can be deduced from value inspection $NV_{13} = -NV_{12}$.

The *human* notation for *cat-to-human* transforms can be:

$$Transform\ 65:\ cat+ \rightarrow human^{+} + (-3)$$

$$Transform\ 66:\ potential+ \rightarrow human^{+} + (-2)$$

$$Transform\ 67:\ search\pm \rightarrow human^{+} + (-1)$$

$$Transform\ 68:\ human+ \rightarrow human^{+} + 0$$

In de terming the transform values of search notation for cat-2-human transformation, TVs are:

TV_{65}=-3, TV_{66}=-2, TV_{67}=-1 and TV_{68}=0.

The notation value is sum of the four TVs and can be calculated as:

$$NV_{14} = \sum_{n=65}^{68} TV_n = TV_{65} + TV_{66} + TV_{67} + TV_{68} = -3 - 2 - 1 + 0 = \underline{-6.}$$

The consummative notation value =

$$SNV = \sum_{1}^{14} NV_n = \begin{array}{c} NV_1 + NV_2 + NV_3 + NV_4 + NV_5 + NV_6 + NV_7 + NV_8 + NV_9 \\ + NV_{10} + NV_{11} + NV_{12} + NV_{13} + NV_{14} \\ = 15 + 9 + 3 - 3 - 9 - 15 + \\ 6 + 2 - 2 - 6 + 6 + 2 - 2 - 6 \\ = 0. \end{array}$$

The consummative notation value indicates that states of the dynamic system is in equilibrium at zero.

3 CLAIMS and RESULTS OF WORK:

1. The transform value is the transform number in the transformation representation.

2. The notation value is calculated as $NV = \sum_{n=1}^{i} TV_n$ where i is the number of transform values and TV is transform value.

3. A consummative notation value(SNV) is calculated as

$SNV = \sum_{n=1}^{i} NV_n$ where i is the number of notation values and NV is the notation value.

4. In state of equilibrium of the dynamical cat system, the consummative notation value is zero.

4 CONCLUSION

This study started with an introduction to cause-effect simulation. The transform values and their corresponding notation value for each transformation is determined. The concept of change by transformation method is represented by transform value or notation value and the representation of transformations. The transform value of each transform is expressed in a double application notation. In concluding this study-work, the consummative notation value is determined to indicate the state of equilibrium of the dynamical cat system.

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CHAPTER 3:

A LOGICAL CONSTRUCTION OF CYBERNETIC VALUES BASED ON CAT SYSTEM.

Frank Appiah

A LOGICAL CONSTRUCTION OF CYBERNETIC VALUES BASED ON CAT SYSTEM.

Abstract: In this work, I study the determination of cybernetic values of a cat system based on logical construction approach. In each transformation, the cybernetic value of every transform is calculated along with their logical operations.

Keywords: nature; operand; mutual; operator; cause-effect; interaction;logical; transformation; change.

Subject classification codes:

1 INTRODUCTION

Sometimes, it is needed to have a compact representation of operands of a transformation. The specification of transformation is made simple by simply relation that links all operands to their respective transforms. An operand can be represented:

$$Transform: \ \ Operand \rightarrow Operand + Number$$

The case of point of a cause case towards an effect case for cat-to-physicale is represented as:

$$\boldsymbol{cat}+ \rightarrow \boldsymbol{potential}+ \rightarrow \boldsymbol{symbol}+ \rightarrow \boldsymbol{operation}+ \rightarrow \boldsymbol{intelligence}+ \rightarrow \boldsymbol{physicale}- .$$

The *cat* notation for cat-to-physicale transforms can be:

$$Transform\ 1: \ cat+ \rightarrow cat^{+} + \ 0$$

$$Transform\ 2: \ \ potential+ \rightarrow cat^{+} + \ 1$$

$$Transform\ 3: \ symbol+ \ \rightarrow cat^{+} + \ 2$$

$$Transform\ 4: \ operation+ \rightarrow cat^{+} + \ 3$$

$$Transform\ 5: \ intelligence+ \rightarrow cat^{+} + \ 4$$

$$Transform\ 6: \ \ physicale- \rightarrow cat^{+} + \ 5 .$$

The *potential* notation for the cat-2-physicale transforms can be:

$$Transform\ 7: \ cat+ \rightarrow potential^{+} + \ (-1)$$

$$Transform\ 8: \ \ potential+ \rightarrow potential^{+} + \ 0$$

$$Transform\ 9: \ symbol+ \ \rightarrow potential^{+} + \ 1$$

$$Transform\ 10: \ operation+ \rightarrow potential^{+} + \ 2$$

$$Transform\ 11: \ \ intelligence+ \rightarrow potential^{+} + \ 3$$

$$Transform\ 12: \ \ physicale- \rightarrow potential^{+} + \ 4$$

The *symbol* notation of the cat-2-physicale transforms can be :

$Transform\ 13:\ \ cat+ \rightarrow symbol^{+}+\ (-2)$

$Transform\ 14:\ \ potential+ \rightarrow symbol^{+}+\ (-1)$

$Transform\ 15:\ \ symbol+\ \rightarrow symbol^{+}+\ 0$

$Transform\ 16:\ \ operation+ \rightarrow symbol^{+}+\ 1$

$Transform\ 17:\ \ intelligence+ \rightarrow symbol^{+}+\ 2$

$Transform\ 18:\ \ physicale- \rightarrow symbol^{+}+\ 3$

The *operation* notation of the cat-2-physicale transforms can be:

$Transform\ 19:\ \ cat+ \rightarrow operation^{+}+\ (-3)$

$Transform\ 20:\ \ potential+ \rightarrow operation^{+}+\ (-2)$

$Transform\ 21:\ \ symbol+\ \rightarrow operation^{+}+\ (-1)$

$Transform\ 22:\ \ operation+ \rightarrow operation^{+}+\ 0$

$Transform\ 23:\ \ intelligence+ \rightarrow operation^{+}+\ 1$

$Transform\ 24:\ \ physicale- \rightarrow operation^{+}+\ 2$

The *intelligence* notation of the cat-2-physicale transforms can be:

$$Transform\ 25:\ cat+ \rightarrow intelligence^{+} + (-4)$$

$$Transform\ 26:\ potential+ \rightarrow intelligence^{+} + (-3)$$

$$Transform\ 27:\ symbol+ \rightarrow intelligence^{+} + (-2)$$

$$Transform\ 28:\ operation+ \rightarrow intelligence^{+} + (-1)$$

$$Transform\ 29:\ intelligence+ \rightarrow intelligence^{+} + 0$$

$$Transform\ 30:\ physicale- \rightarrow intelligence^{+} + 1$$

The *physicale* notation of the cat-2-physicale transforms can be:

$$Transform\ 31:\ cat+ \rightarrow physicale^{-} + (-5)$$

$$Transform\ 32:\ potential+ \rightarrow physicale^{-} + (-4)$$

$$Transform\ 33:\ symbol+ \rightarrow physicale^{-} + (-3)$$

$$Transform\ 34:\ operation+ \rightarrow physicale^{-} + (-2)$$

$$Transform\ 35:\ intelligence+ \rightarrow physicale^{-} + (-1)$$

$$Transform\ 36:\ physicale- \rightarrow physicale^{-} + 0$$

The case of point of a *cause* case towards an effect case for cat-to-mice is represented as:

$$\boldsymbol{cat+ \rightarrow potential+ \rightarrow chase+ \rightarrow mice+.}$$

The *cat* notation for cat-to-mice transforms can be :

$$Transform\ 37:\ cat+ \rightarrow cat^{+}+\ 0$$

$$Transform\ 38:\ potential+ \rightarrow cat^{+}+\ 1$$

$$Transform\ 39:\ chase+\ \rightarrow cat^{+}+\ 2$$

$$Transform\ 40:\ mice+ \rightarrow cat^{+}+\ 3$$

The *potential* notation for *cat-to-mice* transforms can be:

$$Transform\ 41:\ cat+ \rightarrow potential^{+}+\ (-1)$$

$$Transform\ 42:\ potential+ \rightarrow potential^{+}+\ 0$$

$$Transform\ 43:\ chase+\ \rightarrow potential^{+}+\ 1$$

$$Transform\ 44:\ mice+ \rightarrow potential^{+}+\ 2$$

The *chase* notation for *cat-to-mice* transforms can be:

$$Transform\ 45:\ cat+ \rightarrow chase^{+}+\ (-1)$$

$$Transform\ 46:\ potential+ \rightarrow chase^{+}+\ 1$$

$$Transform\ 47:\ chase+\ \rightarrow chase^{+}+\ (0)$$

$$Transform\ 48:\ mice+ \rightarrow chase^{+}+\ 1$$

The *mice* notation for *cat-to-mice* transforms can be:

$$Transform\ 49:\ cat+ \rightarrow mice^{+}+\ (-3)$$

$$Transform\ 50:\ potential+ \rightarrow mice^{+}+\ (-2)$$

$$Transform\ 51:\ chase+ \rightarrow mice^{+}+\ (-1)$$

$$Transform\ 52:\ mice+ \rightarrow mice^{+}+\ 0$$

The case of point of a *cause* case towards an effect case for cat-to-human is represented as:

$$\boldsymbol{cat}+ \rightarrow \boldsymbol{potential}+ \rightarrow \boldsymbol{search}\pm \rightarrow \boldsymbol{human}+.$$

The *cat* notation for cat-to-human transforms can be :

$$Transform\ 53:\ cat+ \rightarrow cat^{+}+\ 0$$

$$Transform\ 54:\ potential+ \rightarrow cat^{+}+\ 1$$

$$Transform\ 55:\ search^{\pm} \rightarrow cat^{+}+\ 2$$

$$Transform\ 56:\ human+ \rightarrow cat^{+}+\ 3$$

The *potential* notation for *cat-to-human* transforms can be:

$$Transform\ 57:\ cat+ \rightarrow potential^{+}+\ (-1)$$

$$Transform\ 58:\ potential+ \rightarrow potential^{+}+\ 0$$

$$Transform\ 59:\ search^{\pm} \rightarrow potential^{+}+\ 1$$

$$Transform\ 60:\ human+ \rightarrow potential^{+}+\ 2$$

The *search* notation for *cat-to-human* transforms can be:

$Transform\ 61:\ cat+ \rightarrow search^{\pm}+\ (-2)$

$Transform\ 62:\ potential+ \rightarrow search^{\pm}+\ (-1)$

$Transform\ 63:\ search\pm\ \rightarrow search^{\pm}+\ (0)$

$Transform\ 64:\ human+ \rightarrow search^{\pm}+\ 1$

The *human* notation for *cat-to-human* transforms can be:

$Transform\ 65:\ cat+ \rightarrow human^{+}+\ (-3)$

$Transform\ 66:\ potential+ \rightarrow human^{+}+\ (-2)$

$Transform\ 67:\ search\pm\ \rightarrow human^{+}+\ (-1)$

$Transform\ 68:\ human+ \rightarrow human^{+}+\ 0$

2 CYBERNETIC VALUES

Logical construct from boolean logic, symbolic logic or mathematical logic is used as cybernetic foundations in the interpretation of the transform to their cybernetic values.

Interpretation of Logical Constructs

1. $A \rightarrow B + C = A \rightarrow B \vee C$

2. $A \rightarrow B = \neg A \vee B$

3. $A \vee B = \neg(\neg A \wedge \neg B)$

4. $A|B = A$

5. $A \wedge B = A \; x \; B$

6. $A \wedge B = B \wedge A$

We now look at the interpretations of the logical constructs:

Transform	Interpretation (0=FALSE, 1=TRUE)
$Transform\,1: \; cat+ \rightarrow cat^{+}+ \; 0$	Operation 1: $cat+ \rightarrow cat^{+} \vee 0$

Transform	Interpretation (0=FALSE, 1=TRUE)
	$cat+ \rightarrow cat^{+}+ 0 =$ $\neg cat+ \vee (cat^{+} \vee 0)$ $= \neg cat+ \vee \neg(\neg cat^{+} \wedge \neg 0)$ $= \neg cat+ \vee \neg(cat+ \wedge 1)$ *apply* 6 $= \neg cat+ \vee \neg 1$ $= \neg cat+ \vee 0 = 0$
Transform 2: $potential+ \rightarrow cat^{+}+ 1$	Operation 2: $Potential+ \rightarrow cat^{+} \vee 1$ $potential+ \rightarrow potential^{+} + 1 =$ $\neg potential+ \vee (potential^{+} \vee 1)$ $= \neg potential+ \vee \neg$ $(\neg potential^{+} \wedge \neg 1)$ $= \neg potential+ \vee \neg$ $(potential+ \wedge 0)$ *apply* 6 $= \neg potential+ \vee \neg 0$ $= \neg potential+ \vee 1 = 1$
Transform 3: $symbol+ \rightarrow cat^{+}+ 2$	Operation 3: $symbol+ \rightarrow cat^{+} \vee 2$ $symbol+ \rightarrow cat^{+}+ 2 =$ $\neg symbol+ \vee (cat^{+} \vee 2)$ $= \neg symbol+ \vee \neg(\neg cat^{+} \wedge \neg 2)$ $= \neg symbol+ \vee \neg(cat+ \wedge 0)$ *apply* 6 $= \neg symbol+ \vee \neg 0$ $= \neg symbol+ \vee 1 = 1$

Transform	Interpretation (0=FALSE, 1=TRUE)
$Transform\,4:\ operation+ \rightarrow cat^{+}+\ 3$	Operation 4: $operation+ \rightarrow cat^{+} \vee 3$ $operation+ \rightarrow cat^{+}+3 =$ $\neg\ operation+ \vee (cat^{+} \vee 3\ )$ $= \neg operation+ \vee \neg (\neg\ cat^{+} \wedge \neg\ 3)$ $= \neg\ operation+ \vee \neg (cat+ \wedge 0)$ apply 6 $= \neg\ operation+ \vee \neg\ 0$ $= \neg\ operation+ \vee\ 1 = 1$
$Transform\,5:\ intelligence+ \rightarrow cat^{+}+\ 4$	Operation 5: $intelligence+ \rightarrow cat^{+} \vee\ 4$ $intelligence\ + \rightarrow cat^{+}+4\ =$ $\neg\ intelligence\ + \vee (cat^{+} \vee 4\ )$ $= \neg intelligence\ + \vee \neg (\neg\ cat^{+} \wedge \neg\ 4$ $= \neg\ intelligence\ + \vee \neg (cat+ \wedge 0)$ appl $= \neg\ intelligence\ + \vee \neg\ 0$ $= \neg\ intelligence\ + \vee\ 1 = 1$
$Transform\,6:\ \ physicale- \rightarrow cat^{+}+\ 5$	Operation 6: $pyhsicale- \rightarrow cat^{+} \vee 5$

Transform	Interpretation (0=FALSE, 1=TRUE)
	$$intelligence + \rightarrow cat^{+} + 4 =$$ $$\neg\, intelligence + \vee (cat^{+} \vee 4\ )$$ $$= \neg intelligence + \vee \neg (\neg\, cat^{+} \wedge \neg\, 4$$ $$= \neg\, intelligence + \vee \neg (cat + \wedge 0)\ apply$$ $$= \neg\, intelligence + \vee \neg\, 0$$ $$= \neg\, intelligence + \vee\ 1 = 1$$
$$Transform\,7:\ \ cat + \rightarrow potential^{+} + (-1)$$	Operation 7: $$cat + \rightarrow potential^{+} \vee -1$$ $$cat + \rightarrow\ potential^{+} + -1 =$$ $$\neg\, cat + \vee (\, potential^{+} \vee -1\ )$$ $$= \neg cat + \vee \neg (\neg\ potential^{+} \wedge \neg -1)$$ $$= \neg\, cat + \vee \neg (\, potential + \wedge 0)\ \ apply$$ $$= \neg\, cat + \vee \neg\, 0$$ $$= \neg\, cat + \vee\ 1 = 1$$
$$Transform\,8:\ \ potential + \rightarrow potential^{+} + 0$$	Operation 8: $$potential + \rightarrow potential^{+} \vee 0$$

Transform	Interpretation (0=FALSE, 1=TRUE)
	$potential+ \rightarrow potential^{+} + 0 = \neg\ potential+ \vee (\ potential^{+} \vee 0\ ) = \neg\ potential+ \vee \neg\ (\neg\ potential^{+} \wedge \neg\ 0) = \neg\ potential+ \vee \neg\ (\ potential+ \wedge 1)\ \ apply\ 6 = \neg\ potential+ \vee \neg\ 1 = \neg\ potential+ \vee\ 0 = 0$
$Transform\ 9:\ \ symbol+ \rightarrow potential^{+} +\ 1$	Operation 9: $symbol+ \rightarrow potential^{+} \vee\ 1$ $symbol+ \rightarrow\ potential^{+} +\ 1 = \neg\ symbol+ \vee (\ potential^{+} \vee\ 0\ ) = \neg\ symbol+ \vee \neg\ (\neg\ potential^{+} \wedge \neg\ 1) = \neg\ symbol+ \vee \neg\ (potential+ \wedge 0)\ \ apply\ 6 = \neg\ symbol+ \vee \neg\ 0 = \neg\ symbol+ \vee\ 1 = 1$
$Transform\ 10:\ \ operation+ \rightarrow potential^{+} +\ 2$	Operation 10: $operation+ \rightarrow\ potential^{+} \vee\ 2$

Transform	Interpretation (0=FALSE, 1=TRUE)
	$operation+ \rightarrow potential^{+} + 2 = \neg operation+ \vee (potential^{+} \vee 0) = \neg operation+ \vee \neg (\neg potential^{+} \wedge \neg 2) = \neg operation+ \vee \neg (potential+ \wedge 0)\ apply\ 6 = \neg operation+ \vee \neg 0 = \neg operation+ \vee 1 = 1$
$Transform\ 11:\ intelligence+ \rightarrow potential^{+} + 3$	Operation 11: $intelligence+ \rightarrow potential^{+} \vee 3$ $intelligence+ \rightarrow potential^{+} + 3 = \neg intelligence+ \vee (potential^{+} \vee 0) = \neg intelligence+ \vee \neg (\neg potential^{+} \wedge \neg 3) = \neg intelligence+ \vee \neg (potential+ \wedge 0)\ apply\ 6 = \neg intelligence+ \vee \neg 0 = \neg intelligence+ \vee 1 = 1$
$Transform\ 12:\ physicale- \rightarrow potential^{+} + 4$	Operation 12 $physicale- \rightarrow potential^{+} \vee 4$

Transform	Interpretation (0=FALSE, 1=TRUE)
	$physicale- \rightarrow potential^{+} + 3 = \neg physicale- \vee (potential^{+} \vee 0) = \neg physicale- \vee \neg (\neg potential^{+} \wedge \neg 3) = \neg physicale- \vee \neg (potential+ \wedge 0)\ apply\ 6 = \neg physicale- \vee \neg 0 = \neg physicale- \vee 1 = 1$
$Transform\ 13:\ cat+ \rightarrow symbol^{+} + (-2)$	Operation 13: $cat+ \rightarrow symbol^{+} \vee -2$ $cat+ \rightarrow symbol^{+} + -2 = \neg cat+ \vee (symbol^{+} \vee -2) = \neg cat+ \vee \neg (\neg symbol^{+} \wedge \neg -2) = \neg cat+ \vee \neg (symbol+ \wedge 0)\ apply\ 6 = \neg cat+ \vee \neg 0 = \neg cat+ \vee 1 = 1$
$Transform\ 14:\ potential+ \rightarrow symbol^{+} + (-1)$	Operation 14: $potential+ \rightarrow symbol^{+} \vee -1$ $potential+ \rightarrow symbol^{+} + -1 = \neg cat+ \vee (symbol^{+} \vee -1) = \neg potential+ \vee \neg (\neg symbol^{+} \wedge \neg -1$ $= \neg potential+ \vee \neg (symbol+ \wedge 0)\ apl$ $= \neg potential+ \vee \neg 0 = \neg potential+ \vee 1 = 1$

Transform	Interpretation (0=FALSE, 1=TRUE)
$Transform\,15:\ symbol+\ \rightarrow\ symbol^{+}+\ 0$	Operation 15: $symbol+\rightarrow symbol^{+}\vee 0$ $symbol+\ \rightarrow\ symbol^{+}+0\ =$ $\neg\ symbol+\vee(symbol^{+}\vee 0\ )$ $=\neg symbol+\vee\neg(\neg\ symbol^{+}\wedge\neg 0)$ $=\neg\ symbol+\vee\neg(symbol+\wedge 1)\ apply$ $=\neg\ symbol+\vee\neg 1$ $=\neg\ symbol+\vee\ 0=0$
$Transform\,16:\ operation+\ -$ $symbol^{+}+\ 1$	Operation 16: $operation+\rightarrow symbol^{+}\vee 1$ $operation+\ \rightarrow\ symbol^{+}+1\ =$ $\neg\ operation+\vee(symbol^{+}\vee 1\ )$ $=\neg operation+\vee\neg(\neg\ symbol^{+}\wedge\neg 1$ $=\neg\ operation+\vee\neg(symbol+\wedge 0)\ ap$ $=\neg\ operation+\vee\neg 0$ $=\neg\ operation+\vee\ 1=1$
$Transform\,17:\ intelligence+\ -$ $symbol^{+}+\ 2$	Operation 17: $intelligence+\rightarrow symbol^{+}\vee 2$

Transform	Interpretation (0=FALSE, 1=TRUE)
	$intelligence+ \rightarrow symbol^{+}+2 =$ $\neg\, intelligence+ \vee (symbol^{+} \vee 2)$ $= \neg\, intelligence+ \vee 1 = 1$
$Transform\,18:\ physicale- \rightarrow symbol^{+}+3$	Operation 18: $physicale- \rightarrow symbol^{+} \vee 3$ $physicale- \rightarrow symbol^{+}+3 =$ $\neg\, physicale- \vee (symbol^{+} \vee 3)$ $= \neg\, physicale- \vee 1 = 1$
$Transform\,19:\ cat+ \rightarrow operation^{+}+(-3)$	Operation 19: $cat+ \rightarrow operation^{+} \vee -3$ $cat+ \rightarrow operation^{+}+-3 =$ $\neg\, operation+ \vee (operation^{+} \vee -3)$ $= \neg\, cat+ \vee 1 = 1$
$Transform\,20:\ potential+ \rightarrow operation^{+}+(-2)$	Operation 20: $potential+ \rightarrow operation^{+} \vee -2$ $potential+ \rightarrow operation^{+}+-2 =$ $\neg\, potential+ \vee (potential^{+} \vee -2)$ $= \neg\, potential+ \vee 1 = 1$

Transform	Interpretation (0=FALSE, 1=TRUE)
$Transform\,21:\ symbol+ \rightarrow operation^{+}+\ (-1)$	Operation 21: $symbol+ \rightarrow operation^{+} \vee -1$ $symbol+ \rightarrow operation^{+}+-1 =$ $\neg\ symbol+ \vee (operation^{+} \vee -1\ )$ $= \neg\ symbol+ \vee\ 1 = 1$
$Transform\,22:\ operation+ \rightarrow operation^{+}+\ 0$	Operation 22: $operation+ \rightarrow operation^{+} \vee 0$ $operation+ \rightarrow operation^{+}+3 =$ $\neg\ operation+ \vee (operation^{+} \vee 3\ )$ $= \neg\ operation+ \vee\ 1 = 1$
$Transform\,23:\ intelligence+ \rightarrow operation^{+}+\ 1$	Operation 23: $intelligence+ \rightarrow operation^{+} \vee 1$ $intelligence\ + \rightarrow operation^{+}+1 =$ $\neg\ intelligence\ + \vee (operation^{+} \vee 1\ )$ $= \neg\ intelligence\ \vee\ 1 = 1$
$Transform\,24:\ physicale- \rightarrow operation^{+}+\ 2$	Operation 24: $physicale- \rightarrow operation^{+} \vee 2$

Transform	Interpretation (0=FALSE, 1=TRUE)
	$physicale- \rightarrow operation^{+}+2 =$ $\neg\ physicale- \vee (operation^{+} \vee 2)$ $= \neg\ physicale- \vee 1 = 1$
$Transform\,25:\ cat+ \rightarrow intelligence^{+}+(-4)$	Operation 25: $cat+ \rightarrow intelligence^{+} \vee -4$ $cat+ \rightarrow intelligence^{+}+-4 =$ $\neg\ cat+ \vee (intelligence^{+} \vee -4)$ $= \neg\ cat+ \vee 1 = 1$
$Transform\,26:\ potential+ \rightarrow intelligence^{+}+(-3)$	Operation 26: $potential+ \rightarrow intelligence^{+} \vee$ $physicale- \rightarrow symbol^{+}+-3 =$ $\neg\ physicale- \vee (symbol^{+} \vee -3)$ $= \neg\ physicale- \vee 1 = 1$
$Transform\,27:\ symbol+ \rightarrow intelligence^{+}+(-2)$	Operation 27: $symbol+ \rightarrow intelligence^{+} \vee -2$ $symbol+ \rightarrow intelligence^{+}+-2 =$ $\neg\ symbol+ \vee (intelligence^{+} \vee -2)$ $= \neg\ symbol+ \vee 1 = 1$

Transform	Interpretation (0=FALSE, 1=TRUE)
$Transform\,28:\ operation+ \rightarrow intelligence^{+} + (-1)$	Operation 28: $operation+ \rightarrow intelligence^{+} \vee$ $operation+ \rightarrow intelligence^{+} + -1 = \neg\, operation \vee (symbol^{+} \vee -1) = \neg\, operation+ \vee 1 = 1$
$Transform\,29:\ intelligence+ \rightarrow intelligence^{+} + 0$	Operation 29: $intelligence \rightarrow intelligence^{+} \vee$ 0 $intelligence+ \rightarrow intelligence^{+} + 0 = \neg\, intelligence+ \vee (intelligence^{+} \vee 0) = \neg\, physicale- \vee 0 = 0$
$Transform\,30:\ physicale- \rightarrow intelligence^{+} + 1$	Operation 30: $physicale- \rightarrow intelligence^{+} \vee 1$ $physicale- \rightarrow intelligence^{+} + 1 = \neg\, physicale- \vee (intelligence^{+} \vee 1) = \neg\, physicale- \vee 1 = 1$
$Transform\,31:\ cat+ \rightarrow physicale^{-} + (-5)$	Operation 31: $cat+ \rightarrow physicale^{-} \vee -5$

Transform	Interpretation (0=FALSE, 1=TRUE)
	$cat+ \rightarrow physicale^{-}+-5 =$ $\neg\, cat+ \vee (\, physicale^{-} \vee -5\,)$ $= \neg\, cat+ \vee\, 1 = 1$
$Transform\,32:\ potential+ \rightarrow physicale^{-}+\,(-4)$	Operation 32: $potential+ \rightarrow\ physicale^{-} \vee -$ $potential+ \rightarrow\ physicale^{-}+-4 =$ $\neg\ potential- \vee (\, physicale^{-} \vee -4\,)$ $= \neg\ potential+ \vee\, 1 = 1$
$Transform\,33:\ symbol+ \rightarrow physicale^{-}+\,(-3)$	Operation 33: $symbol+ \rightarrow physicale^{-} \vee -3$ $symbol+ \rightarrow\ physicale^{-}+-3 =$ $\neg\ symbol+ \vee (\, physicale^{-} \vee -3\,)$ $= \neg\ symbol+ \vee\, 1 = 1$
$Transform\,34:\ operation+ -$ $physicale^{-}+\,(-2)$	Operation 34: $operation+ \rightarrow\ physicale^{-} \vee -2$ $operation+ \rightarrow\ physicale^{-}+-2 =$ $\neg\ operation+ \vee (\, physicale^{-} \vee -2\,)$ $= \neg\ operation+ \vee\ 1 = 1$

Transform	Interpretation (0=FALSE, 1=TRUE)
$Transform\,35:\ intelligence+ \rightarrow physicale^{-}+\ (-1)$	Operation 35: $intelligence+ \rightarrow physicale^{-} \vee$ $intelligence+ \rightarrow physicale^{-}+-1 =$ $\neg\ intelligence+ \vee (physicale^{-} \vee -1)$ $= \neg\ intelligence+ \vee 1 = 1$
$Transform\,36:\ physicale- \rightarrow physicale^{-}+\ 0$	Operation 36: $physicale- \rightarrow physicale^{-} \vee 0$ $physicale- \rightarrow physicale^{-}+0 =$ $\neg\ physicale- \vee (physicale^{-} \vee 0)$ $= \neg\ physicale- \vee\ 0 = 0$
$Transform\,37:\ cat+ \rightarrow cat^{+}+\ 0$	Operation 37: $cat+ \rightarrow cat^{+} \vee\ 0$ $cat+ \rightarrow cat^{+}+0 =$ $\neg\ cat+ \vee (cat^{+} \vee 0)$ $= \neg\ cat+ \vee\ 0 = 0$
$Transform\,38:\ potential+ \rightarrow cat^{+}+\ 1$	Operation 38: $potential+ \rightarrow cat^{+} \vee 1$

Transform	Interpretation (0=FALSE, 1=TRUE)
	$potential+ \rightarrow cat^{+}+1 =$ $\neg\ potential\ \vee (cat^{+} \vee 1)$ $= \neg\ potential \vee 1 = 1$
Transform 39: $chase+ \rightarrow cat^{+}+2$	Operation 39: $chase+ \rightarrow cat^{+} \vee 2$ $chase+ \rightarrow cat^{+}+2 =$ $\neg\ chase+ \vee (cat^{+} \vee 2)$ $= \neg\ chase+ \vee 1 = 1$
Transform 40: $mice+ \rightarrow cat^{+}+3$	Operation 40: $mice+ \rightarrow cat^{+} \vee 3$ $mice+ \rightarrow cat^{+}+3 =$ $\neg\ mice+ \vee (cat^{+} \vee 3)$ $= \neg\ cat+ \vee 1 = 1$
Transform 41: $cat+ \rightarrow potential^{+}+(-1)$	Operation 41: $cat+ \rightarrow potential^{+} \vee -1$ $cat+ \rightarrow potential^{+}+-1 =$ $\neg\ cat+ \vee (potential^{+} \vee -1)$ $= \neg\ cat+ \vee 1 = 1$

Transform	Interpretation (0=FALSE, 1=TRUE)
Transform 42: potential+ → potential^{+} + 0	Operation 42: $potential+ \rightarrow potential^{+} \vee 0$ $potential+ \rightarrow potential^{+} + 0 = \neg potential \vee (potential^{+} \vee 0) = \neg potential \vee 0 = 0$
Transform 43: chase+ → potential^{+} + 1	Operation 43: $chase+ \rightarrow potential^{+} \vee 1$ $chase+ \rightarrow potential^{+} + 1 = \neg chase \vee (potential^{+} \vee 1) = \neg chase+ \vee 1 = 1$
Transform 44: mice+ → potential^{+} + 2	Operation 44: $mice+ \rightarrow potential^{+} \vee 2$ $mice+ \rightarrow potential^{+} + 2 = \neg mice+ \vee (potential^{+} 2) = \neg mice+ \vee 1 = 1$
Transform 45: cat+ → chase^{+} + (−1)	Operation 45: $cat+ \rightarrow chase^{+} \vee -1$

Transform	Interpretation (0=FALSE, 1=TRUE)
	$cat+ \rightarrow chase^{+}+-1 =$ $\neg\, cat+ \vee (chase^{+} \vee -1)$ $= \neg\, cat+ \vee\ 1 = 1$
Transform 46: $potential+ \rightarrow chase^{+}+\ 1$	Operation 46: $potential+ \rightarrow chase^{+} \vee 1$ $potential+ \rightarrow chase^{+}+\ 1 =$ $\neg\ potential+ \vee (chase^{+} \vee 1)$ $= \neg\ potential+ \vee\ 1 = 1$
Transform 47: $chase+ \rightarrow chase^{+}+ (0)$	Operation 47: $chase+ \rightarrow chase^{+} \vee 0$ $chase+ \rightarrow chase^{+}+ 0 =$ $\neg\ chase+ \vee (chase^{+} \vee 0)$ $= \neg\ chase+ \vee\ 0 = 0$
Transform 48: $mice+ \rightarrow chase^{+}+\ 1$	Operation 48: $mice+ \rightarrow chase^{+} \vee 1$ $mice+ \rightarrow chase^{+}+ 1 =$ $\neg\ mice+ \vee (chase^{+} \vee 1)$ $= \neg\ mice+ \vee\ 1 = 1$

Transform	Interpretation (0=FALSE, 1=TRUE)
Transform 49 : $cat+ \rightarrow mice^{+}+ (-3)$	Operation 49: $cat+ \rightarrow mice^{+} \vee -3$ $cat+ \rightarrow mice^{+}+ -3 =$ $\neg\, cat+ \vee (mice^{+} \vee 3)$ $= \neg\, cat+ \vee 1 = 1$
Transform 50 : $potential+ \rightarrow mice^{+}+ (-2)$	Operation 50: $potential \rightarrow mice^{+} \vee -2$ $potential+ \rightarrow mice^{+}+ -2 =$ $\neg\, potential+ \vee (mice^{+} \vee -2)$ $= \neg\, potential+ \vee 1 = 1$
Transform 51 : $chase+ \rightarrow mice^{+}+ (-1)$	Operation 51: $chase+ \rightarrow mice^{+} \vee -1$ $chase+ \rightarrow mice^{+}+ -1 =$ $\neg\, chase+ \vee (mice^{+} \vee -1)$ $= \neg\, chase+ \vee 1 = 1$
Transform 52 : $mice+ \rightarrow mice^{+}+ 0$	Operation 52: $mice+ \rightarrow mice^{+} \vee 0$

Transform	Interpretation (0=FALSE, 1=TRUE)
	$mice+ \rightarrow mice^{+} + 0 =$ $\neg\, mice+ \vee (mice^{+} \vee 0)$ $= \neg\, mice+ \vee 0 = 0$
Transform 53 : $cat+ \rightarrow cat^{+} + 0$	Operation 53: $cat+ \rightarrow cat^{+} \vee 0$ $cat+ \rightarrow cat+^{+} + 0 =$ $\neg\, cat+ \vee (cat^{+} \vee 0)$ $= \neg\, cat+ \vee 0 = 0$
Transform 54 : $potential+ \rightarrow cat^{+} + 1$	Operation 54: $potential+ \rightarrow cat^{+} \vee 1$ $potential+ \rightarrow cat^{+} + 1 =$ $\neg\, potential+ \vee (cat^{+} \vee 1)$ $= \neg\, potential \vee 1 = 1$
Transform 55 : $search^{\pm} \rightarrow cat^{+} + 2$	Operation 55: $search\pm \rightarrow cat^{+} \vee 2$ $search\pm \rightarrow cat^{+} + 2 =$ $\neg\, search\pm \vee (cat^{+} \vee 2)$ $= \neg\, search\pm \vee 1 = 1$

Transform	Interpretation (0=FALSE, 1=TRUE)
Transform 56: $human+ \rightarrow cat^{+} + 3$	Operation 56: $human+ \rightarrow cat^{+} \vee 3$ $human+ \rightarrow cat^{+} + 3 = \neg human+ \vee (cat^{+} \vee 3) = \neg human+ \vee 1 = 1$
Transform 57: $cat+ \rightarrow potential^{+} + (-1)$	Operation 57: $cat+ \rightarrow potential^{+} \vee -1$ $cat+ \rightarrow potential^{+} + -1 = \neg cat+ \vee (potential^{+} \vee -1) = \neg cat+ \vee 1 = 1$
Transform 58: $potential+ \rightarrow potential^{+} + 0$	Operation 58: $potential+ \rightarrow potential^{+} \vee 0$ $potential+ \rightarrow potential^{+} + 3 = \neg potential+ \vee (potential^{+} \vee 0) = \neg potential+ \vee 0 = 0$
Transform 59: $search^{\pm} \rightarrow potential^{+} + 1$	Operation 59: $search\pm \rightarrow potential^{+} \vee 1$

Transform	Interpretation (0=FALSE, 1=TRUE)
	$search\pm \rightarrow potential^{+} + 1 =$ $\neg\, search\pm \vee (\, potential^{+} \vee 1\,)$ $= \neg\, search\pm \vee 1 = 1$
Transform 60*:* $human+ \rightarrow potential^{+} + 2$	Operation 60: $human+ \rightarrow potential^{+} \vee 2$ $human+ \rightarrow potential^{+} + 2 =$ $\neg\, human \vee (\, potential^{+} \vee 2\,)$ $= \neg\, human+ \vee 1 = 1$
Transform 61*:* $cat+ \rightarrow search^{\pm} + (-2)$	Operation 61: $cat+ \rightarrow search^{\pm} \vee -2$ $cat+ \rightarrow search^{\pm} + -2 =$ $\neg\, cat+ \vee (search^{\pm} \vee -2\,)$ $= \neg\, cat+ \vee 1 = 1$
Transform 62*:* $potential+ \rightarrow search^{\pm} + (-1)$	Operation 62: $potential+ \rightarrow search^{\pm} \vee -1$ $physicale- \rightarrow symbol^{+} + 3 =$ $\neg\, physicale- \vee (symbol^{+} \vee 3\,)$ $= \neg\, physicale- \vee 1 = 1$

Transform	Interpretation (0=FALSE, 1=TRUE)
Transform 63: $search\pm \rightarrow search^{\pm} + (0)$	Operation 63: $search\pm \rightarrow search^{\pm} \vee 0$ $search\pm \rightarrow search^{\pm} + 0 =$ $\neg\, search\pm \vee (search^{\pm} \vee 0)$ $= \neg\, search \vee 0 = 0$
Transform 64: $human+ \rightarrow search^{\pm} + 1$	Operation 64: $human+ \rightarrow search^{\pm} \vee 3$ $human+ \rightarrow search^{\pm} + 1 =$ $\neg\, human \vee (search^{\pm} \vee 1)$ $= \neg\, human \vee 1 = 1$
Transform 65: $cat+ \rightarrow human^{+} + (-3)$	Operation 65: $cat+ \rightarrow human^{+} \vee -3$ $cat+ \rightarrow human^{+} + -3 =$ $\neg\, cat+ \vee (human^{+} \vee -3)$ $= \neg\, cat+ \vee 1 = 1$
Transform 66: $potential+ \rightarrow human^{+} + (-2)$	Operation 66:

Transform	Interpretation (0=FALSE, 1=TRUE)
	$potential+ \rightarrow human^{+} \vee -2$ $potential+ \rightarrow human^{+} + -2 =$ $\neg\, potential+ \vee (human^{+} \vee -2\,)$ $= \neg\, potential+ \vee\ 1 = 1$
Transform 67*:* $search\pm \rightarrow human^{+} + (-1)$	Operation 67: $search\pm \rightarrow human^{+} \vee -1$ $search\pm \rightarrow human^{+} + -1 =$ $\neg\, search\pm \vee (human^{+} \vee -1\,)$ $= \neg\, search\pm \vee\ 1 = 1$
Transform 68*:* $human+ \rightarrow human^{+} + 0$	Operation 68: $human+ \rightarrow human^{+} \vee 0$ $human+ \rightarrow human^{+} + 0 =$ $\neg\, human \vee (human^{+} \vee 0\,)$ $= \neg\, human+ \vee\ 0 = 0$

3CLAIMS and RESULTS OF WORK:

1. The interpretation of the logical construct of a transform with a zero number is FALSE.

2. The interpretation of the logical construct of a transform with a negative or positive number but greater than 1 is TRUE

3. There are 54 interpretations of logical construct of a transform with a negative or a positive number greater than 1.

4. There are 14 interpretations of logical construct of a transform with a zero number .

5. There are 54 TRUE interpretations of logical construct of a transform with a negative or a positive number greater than 1.

6. There are 14 FALSE interpretations of logical construct of a transform with a zero number .

7. There are about 68 interpretations of logical constructs of transforms in a cat transformation.

4 CONCLUSION

This study-work started with an introduction to cat causation and effection states stimulated from [6]. Then a transformation of state transitions of the cat stimulated model are shown. A logical construction of each transform with interpre-

tation is done. A list of claims are enumerated as a final class-note of this study.

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